



# Prevalence of *Menopon gallinae* Linn. (Insecta, Phthiraptera, Menoponidae, Amblycera) upon poultry birds (*Gallus gallus domesticus*) of selected locality of district Chamoli Garhwal (Uttarakhand), India

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**Abstract:** Prevalence and intensity of infestation of *Menopon gallinae* (Linn.) was recorded from 688 poultry birds belonging to 30 selected locality of district Chamoli (Uttarakhand) during March, 2012 to February, 2013, out of which 310 were found infested (45.06%). Prevalence rate were higher in female (46.8%) than male (42%) birds in present investigation. Higher infestation were noted in certain parameters like captivity (larger group), poor health, poor hygienic condition, poor feather condition, black feather colour, desi breed and older birds. Singly reared, good health, good hygienic condition, good feather condition, mix colour, broiler breed and younger poultry birds were found to have least infestation. Intensity of infestation was noted by coding system. Maximum poultry bird bore very light (VL) infestation (29.68%) while very few were found with very heavy (VH) infestation (4.52%). Relative monthly intensity of infestation remained more or less similar in all the categories. Lice were peaked during summer in comparison to the winter. Strong positive correlation existed between monthly lice index and temperature (+0.79); lice index and photoperiod (+0.84), while the same were found insignificant with humidity (-0.23) and rainfall (-0.17).

**Keywords:** *Menopon gallinae*, Phthiraptera, Poultry bird, Prevalence

## INTRODUCTION

*Menopon gallinae* is one of the dreaded lice (phthirapteran) species of poultry which feeds on host blood. According to Derylo (1974a,b) and Saxena *et al.* (1985), haematophagous louse not only affect the vitality and productivity of their host but also act as reservoir and transmitter of pathogens causing fowl cholera, typhoid and toxoplasmosis. Ruff (1999) stated that these lice retard the growth, lowered the vital activity and damage the health condition of the host. Thus, these phthirapterans affect bird health directly by causing irritation, discomfort, tissue damage, blood loss, allergy, dermatitis which in turn reduce the quantity and quality of meat and egg production. Prevalence and intensity of infestation of phthirapteran ectoparasite in different avian host has been noted from time to time (Clayton and Drown, 2001; Darolova *et al.*, 2001; Johnson *et al.*, 2005; Prelezov *et al.*, 2006; Prelezov and Koinarski, 2006; Beg *et al.*, 2008; Khan *et al.*, 2008; Mungube *et al.*, 2008; Orunc and Bicek, 2009; Salam *et al.*, 2009; Singh *et al.*, 2009a,b; Naz *et al.*, 2010; Ahmad *et al.*, 2011, 2012; Arya *et al.*, 2011, 2012; Banda, 2011; Begum and Sehrin, 2011; Sychra *et al.*, 2008, 2011; Enout *et al.*, 2012 and Mukaratirwa and Khumalo, 2012). Agarwal and Saxena (1979) noted the incidence of one poultry lice species, *Lipeurus lawrensis*

*tropicalis* from Varanasi. Incidence of some phthirapteran species on poultry of Dehradun has been recorded by Trivedi *et al.* (1992). Prevalence of poultry shaft louse, *M. gallinae* was noted from certain locality of the Garhwal and Rampur (U.P.) by Saxena *et al.* (1995, 2004). They found *M. gallinae* to be the most prevalent louse species in few localities of Garhwal. Except these few papers, there is no literature on prevalence of *M. gallinae* in Uttarakhand region. Keeping in view the economic and epizootic importance of this louse and lacuna of field, prevalence and intensity of infestation of *M. gallinae* on poultry birds in the selected locality of district Chamoli Garhwal, Uttarakhand, has been surveyed.

## MATERIALS AND METHODS

A total of 688 poultry birds from 30 different localities of district Chamoli Garhwal (Table 1), were surveyed during March, 2012 to February, 2013 to record the prevalence rate of *M. gallinae* (Phthiraptera, Amblycera). The breed of observed poultry birds were mostly desi, broiler, white leghorn and wild. Delousing method of Clayton and Drown (2001) was applied during present work along with time visual counts (for those birds which belongs to private owners / poultry keepers). Samples of *M. gallinae* from poultry birds were collected without causing any harm to the host. For that, bird's legs were tied with

threads or rubber band gently and wings deflected with fingers / forceps to record the presence of lice. A magnifying lens was found useful for searching the lice. Each infested bird was subjected to 5 minutes observation. Coding system of Harshbarger and Raffensperger (1961) for counting the lice has been applied in the present studies. Lice up to 25 lice VL (very light), 26-50 L (light), 51- 75 M (moderate), 76–100 H (heavy) and more than 100 lice VH (very heavy) categories were made. All the collected lice were placed in glass vial containing 70% alcohol for further studies. Permanent slides of collected lice were made and identified on the basis of their morphological character as per Fabiyi (1980) for louse species confirmation.

RESULTS

Out of 688 (438 females and 250 males) poultry birds, 310 (46.8% females and 42% males) were found infested. The overall prevalence rate of infestation was noted as 45.06% in both the sexes, in which female poultry outnumbered the males (Fig. 1A). The captivity of examined host birds in order to observe the impact of crowding on prevalence rate was also noted. Out of 310 infested birds, 72 birds were being reared singly, 112 in group of 2-5, while 126 in bigger groups (more than 5). The prevalence rate in these three groups remained 31%, 45% and 60% respectively (Fig. 1B). The general health of infested poultry birds were solely arbitrary observe first glance impression and categorized as healthy, normal and weak. The prevalence rate in these categories was noted as 39% healthier, 42% average and 66% weaker birds, respectively (Fig. 1C). Hygienic condition (cleanliness around site) was recorded through placing the infested birds in one of the three categories - good, normal and poor. Infestation rate on poor hygienic condition poultry was found 63%, followed by 46% normal and 30% good, respectively (Fig. 1D). Feather condition of observe poultry birds was categorized as - good, normal and poor. Birds having damaged and ruffled feathers were placed in poor

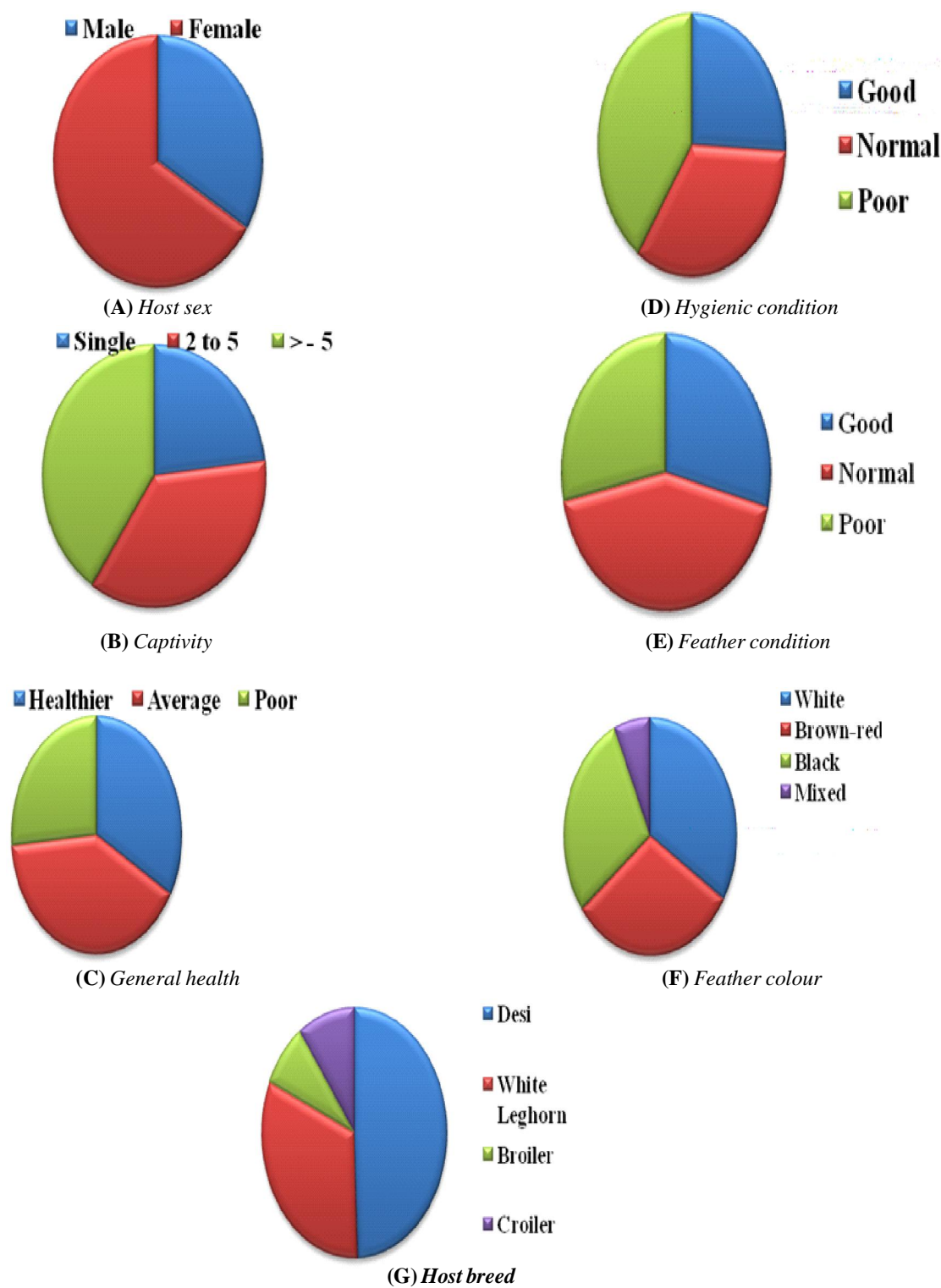
category. Prevalence of lice remained higher (67%) in such birds in comparison to good (37%) and normal categories (42%), respectively (Fig. 1E). Impact of feather colour of the host on prevalence has also been noted during the present study. Feathers were categorized as white, brown-red, black and mixed colour. Prevalence of *M. gallinae* were found highest in black colour feathers (66%), followed by brown-red (56%), white (49%) and mix colour (12%), respectively (Fig. 1F). Breed of poultry birds has also been noted to observe the prevalence rate of *M. gallinae*. Maximum prevalence rate were noted on desi (indigenous breed (64%), followed by white leghorn (51%), broiler (20%) and croiler (interbreed between broiler and layer) (26%) (Fig. 1G).

Effect of host age on the prevalence was recorded by placing in one of following categories viz. 0-6, 7-12, 13-18 and above 18 months. The prevalence rate remained lowest (27%) in younger birds aged 0-6 months while it was more than double in 7-12 and 13-18 months age old birds (60% and 65%), respectively. Maximum prevalence rate could be noted in upper age birds (75%) (Fig. 2A). Maximum birds bore very light (VL) infestation (30%), followed by light (L) (27%), moderate (M) (23%) and heavy (H) (15%). Minimum prevalence rate (5%) has been noted in very heavy (VH) infested category (Fig. 2B).

Monthly lice incidence rate exhibited some striking difference during different months of year (March, 2012 to February, 2013). Maximum lice index could be recorded in June (63) while minimum was in January (32). In March, 2012 the lice index was 41 which slightly rose in April (43). A sudden jump (58) in lice index was recorded in the month of May which peaks in June (63). From July gradual fall in lice index till November were recorded as 56, 49, 46, 44 and 33 respectively. Minor increase in lice index was noted in December (34) which was fall up to 32 in January 2013 and slightly increased in February 2013 (35) (Fig. 3). Correlation between mean monthly lice index and mean monthly temperature, photoperiod, humidity and rainfall has been established. Positive correlation exhibited in

**Table 1.** Localities of Chamoli Garhwal (Uttarakhand) surveyed for poultry shaft louse, *M. gallinae* (Phthiraptera, Amblycera) during March, 2012 to February, 2013.

S. N.	Name of locality	S. N.	Locality	S. N.	Locality
1	Vikas Nagar (Ghat)	11	Helang	21	Mailkhet
2	Narangi (Ghat)	12	Mandal	22	Meenggadhera
3	Kurad	13	Udamandla	23	Raini
4	Mathkot	14	Nauti	24	Latta
5	Simli	15	Tharali	25	Tapovan/Dhak
6	Karanprayag	16	Dewal	26	Parsari/Badagaon
7	Narayanbagar	17	Bairaskund	27	Gwaldom
8	Langasu	18	Lwani	28	Talwari
9	Baccher	19	Ramni	29	Kulsari
10	Joshimath	20	Sitel	30	Salna/Jorasi



**Figs. 1 A-G.** Showing impact of certain factor of poultry birds on prevalence of *Menopon gallinae* (March, 2012 to February, 2013).

case of temperature (+0.79) and photoperiod (+0.84) while the same was negative and insignificant with humidity (-0.23) and rainfall (-0.17), respectively.

**DISCUSSION**

This is the specific study conducted on prevalence of poultry shaft louse, *M. gallinae* in selected locality of district Chamoli, which is slightly temperate region in

comparison to other high altitude regions. *M. gallinae* is a dreadful lice and very harmful to poultry farmer due to its haematophagous nature. Many workers have noted the prevalence rate of *M. gallinae* in different parts of countries. Trivedi *et al.* (1992) recorded 44.7% prevalence rate of *M. gallinae* in Dehradun while, Saxena *et al.* (1995) could note 67.6% for the same louse in Garhwal. Saxena *et al.* (2004) tried the same in Rampur (U.P.) and found

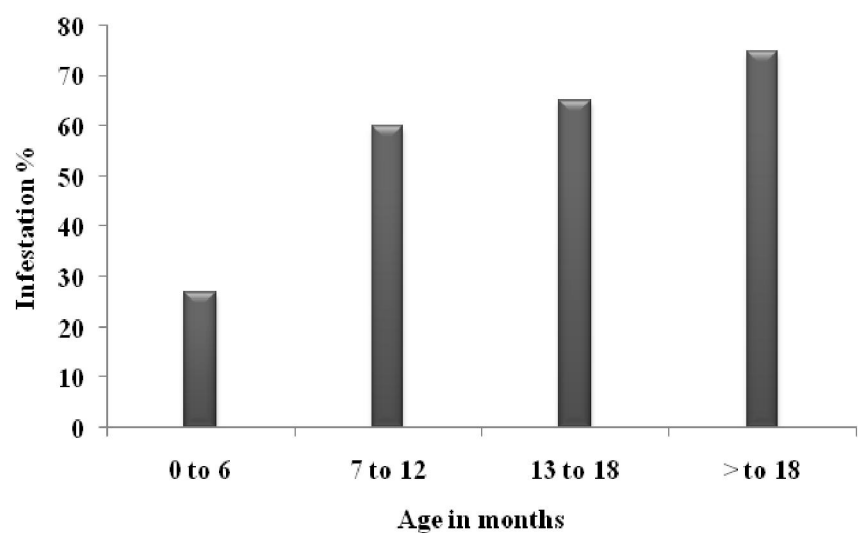


Fig. 2A. Prevalence rate of *M. gallinae* in relation to host age.

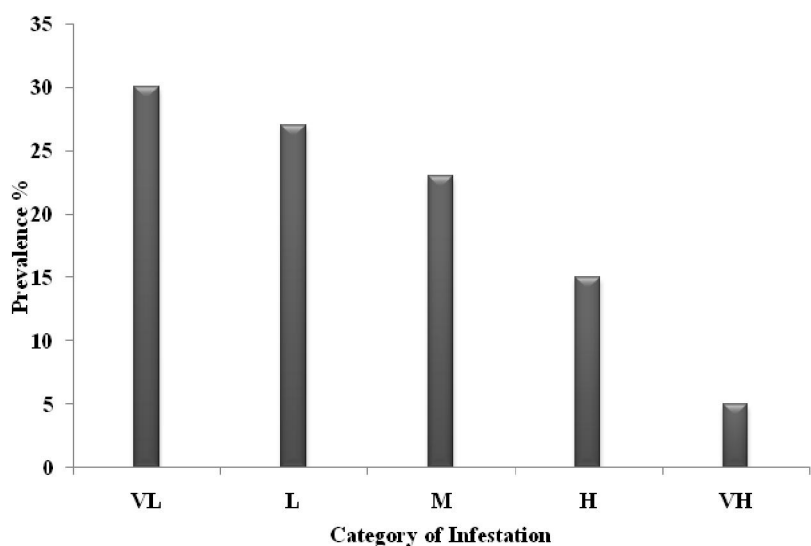


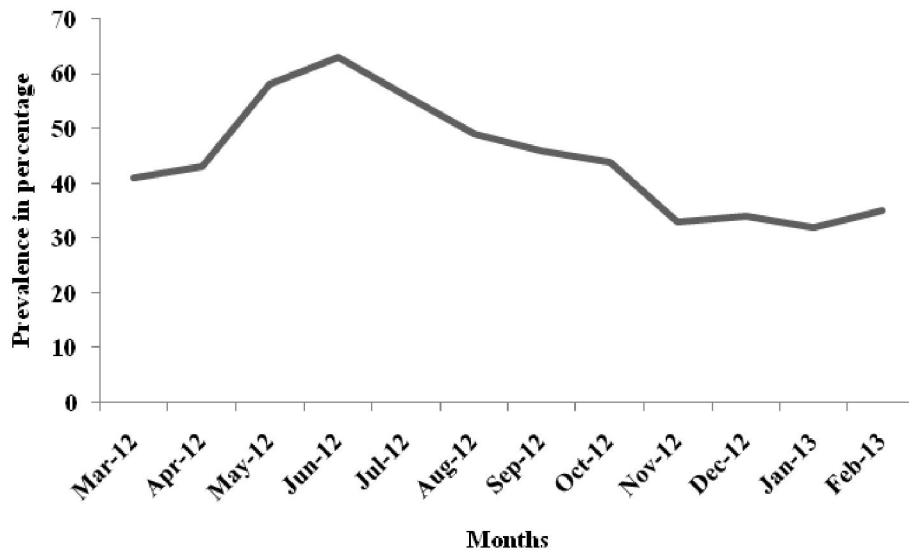
Fig. 2B. Overall relative intensity of *M. gallinae* on poultry birds.

51.3% prevalence rate. Moreover, prevalence of this louse was remained 35.9% in Bulgaria (Prelezov *et al.*, 2006); 34.4% in Kashmir Valley (Salam *et al.*, 2009) and 33.3% in Malawi (Banda, 2011), Respectively. Prevalence of *M. gallinae* in present study remained more or less similar (45.1%). Begum and Sehrin (2011) have noted 100% prevalence of this louse on pigeons (instead of poultry) in Bangladesh. So, it is quite evident that prevalence rate of *M. gallinae* varies from region to region due to different climatic condition.

Different parameters have been taken by some other workers to check the impact on prevalence on certain avian hosts (Eveleigh and Threlfall, 1976; Saxena *et al.*, 1995; Singh *et al.*, 2009a, 2009b; and Arya *et al.*, 2012). Prevalence on host sex, feather condition and age remained more or less similar as done by previous workers. Female poultry was found more infested than the male one. Poultry with black colour feather were found most prevalent (66%) than brown-red (56%), white (49%)

and mix colour (12%). Although, Saxena *et al.* (1995, 2004) and Singh *et al.* (2009a,b) has found the host colour as negligible influence on the incidence rate. This may be due to different environmental condition. Grouped birds were infested more than singly (Saxena *et al.*, 1995; Singh *et al.*, 2009a,b) again justify the present results. In contrary to the general belief that unhealthy birds are more prone to infestation, the present studies indicate incidence on visibly weaker birds remained highest than good and normal health. Unhygienic captive birds also reported high infestation rate of lice. desi (indigenous breed of host remained highest (64%) prevalent followed by white leghorn (51%), broiler (20%) and croiler (26%), respectively.

Avian phthirapteran peaks in summer (Eveleigh and Threlfall, 1976; Agarwal and Saxena, 1979; Saxena *et al.*, 1995, 2004; Singh *et al.*, 2009a,b and Arya *et al.*, 2012) and almost same results remained during present investigation. It was observed that lice find their breeding



**Fig. 3.** Mean monthly prevalence of *M. gallinae* during March, 2012 to February, 2013.

place inside the feathers where the temperature suits them along with a hidden shelter, so their population increases during summer, while in winter these lice become inactive due to low temperature of feathers. Role of breeding seasons and nesting activity of host birds may influence lice population (Saxena *et al.*, 1995 and Singh *et al.*, 2009a, 2009b). Environmental temperature presumably may play a dominant role in determining the prevalence and infestation intensity of phthirapteran ectoparasites.

## Conclusion

This is the first hand report on prevalence rate of poultry shaft louse, *M. gallinae* in Chamoli Garhwal (Uttarakhand) region. All the localities surveyed during present investigation belong to high altitudinal areas where environmental fluctuation occurs very rapidly. Factors may play a major role in the prevalence of phthirapteran species and from this report it is evident as heavy and very heavy infested poultry birds were found very less in comparison to very light, light and moderately infestation. Moreover, impact has also been seen in feather colour and host breeds.

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